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ORIGINAL ARTICLE

Upregulation of Pro-inflammatory Cytokine Genes by Parvovirus B19 in Human Bone Marrow Mesenchymal Stem Cells

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Abstract

Chronic inflammation plays a prominent role in cancer initiation and development. On the other hand, the Inflammation can be established by a number of factors such as viral infections. Parvovirus B19 (B19V) is a pathogen with widespread infection, which infects bone marrow erythroid progenitor cells. It has been shown that B19V can also enter human bone marrow mesenchymal stem cells (BM-MSCs). In this study, we hypothesized that BM-MSCs as the main cellular component of bone marrow niche may be induced to secret pro-inflammatory cytokines after B19V infection. BM-MSCs were cultured up to passage 3. The cells were then subjected to nucleofection to transfer a plasmid containing B19V genome. After 36 h, total RNA was extracted and the expression levels of IL-1β, IL-6, TNF-α and NF-κB genes were examined using qRT-PCR. Data analysis showed the significant increase in expression levels of all studied genes in the B19V-transfected cells ($P < 0.05$). Although further researches are required, our findings for the first time suggest the importance of B19V infection to establish an inflammatory microenvironment in the bone marrow and its involvement in inflammation-related diseases. Finally, based on our results, molecular assay to diagnose B19V infection of BM-MSCs prior to stem cell therapy is strongly recommended.

Keywords Bone marrow · Chronic inflammation · Infection · Mesenchymal stem cell · Parvovirus B19

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